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ART. XXVI.—*Note on the Cotton Soils of Georgia, by Mr. SOLLY.*

Read Feb. 16, 1839.

THE successful cultivation of cotton depends on a variety of circumstances, to each of which attention should be paid; amongst the foremost in importance are, attention to the climate, and to the soil. In endeavouring to introduce into one country the mode of cultivation, long known and practised with success in another, the local peculiarities of the country, as influenced by the form of the surface, the vicinity of hills, and nature of the surrounding countries, together with the consequent modifications of atmospheric phenomena produced by it, must be observed. These, in connexion with the capacity for heat, the radiating power, the rapidity of evaporation, and the structure and composition of the soil, both physical and chemical, require investigation. These points are all of vital importance, and must be studied both in detail and in connexion with each other, to obtain useful results.

Considering the subject as one of very great importance to India, the Committee of Commerce and Agriculture have procured, through the assistance of Her Majesty's Consul at Savannah, information on many points connected with the cultivation of cotton in Georgia, and also specimens of soil taken from four of the principal plantations in that country; these specimens are now arrived, and are in course of examination, and being sufficiently numerous and collected from localities at a distance from each other, there is reason to hope that the investigation of their composition will throw some light on the nature of the soil best suited to the cotton plant. One of the specimens is peculiarly well suited for an examination of this kind, as the cotton grown in the plantation from which it is taken, is said to be the best of any produced in the state of Georgia, and to fetch a price of 4*d.* per lb. above the highest market price obtained for the cotton from other plantations. The influence which the nature of the cotton soil exerts on the produce of the plants, is variously estimated by different authors, but all agree that it has considerable influence. It is evident that the nature of the soil must be considered in connexion with the peculiarities of the climate of the country, if useful deductions are to be drawn, because the soil which, in one climate, would be well adapted to the cultivation of cotton, would, in another, be probably quite inapplicable. It

must therefore be remembered that a cotton plantation in India, even though the soil were of precisely the same nature as that of the plantations in Georgia, would be under very different circumstances, if the climate were different. It is, no doubt, owing to not properly comparing these circumstances that some planters have considered land in the immediate vicinity of the sea to be superior to all other, whilst others again have found plantations far more inland, thrive quite as well and equally productive. Upon consulting the best authors who have written upon this subject, I find that they mostly mention as best suited for the cotton plants, a light sandy soil, and one not too rich, because, in a soil of the latter description, the plant grows too luxuriantly, and forms a great abundance of leaves, though but little cotton. Dr. Royle says, in his *Illustrations of the Botany, &c., of the Himalayas*, "the soil best adapted for the cotton is a light and sandy soil, particularly if held together by a little clay or calcareous earth, and mixed with a small portion of vegetable matter, but volcanic deposits are said to be the most favourable, and the banks of rivers which are overflowed and become covered with mud. A moderate degree of moisture is essential, but too great aridity is injurious, and must be counteracted by irrigation, and as an excess of moisture induces the production of a profusion of leaves and flowers, though the latter fall off and the roots rot, it must be obviated by drainage."

Mr. Hughes, of Tinnevely, in his paper on the cultivation of the Bourbon cotton, states that he found the red and brown loams, or, indeed, any siliceous or calcareous soils, fertile in a moderate degree, best suited; and that the so-called black cotton soil was not at all suited. But Mr. Heath, who successfully cultivated the Bourbon cotton, mentions that the annual variety of cotton which is cultivated in the district, on the Coromandel coast, south of Madras, grows only in the black cotton soil, which he supposed was formed by the decomposition of trap rocks. If this supposition be correct, it is evident that the black cotton soil of India is of a very different nature from the black cotton soil of North America, and the blackness of the Indian soil is, probably, caused by the presence of oxide of iron, whilst the colour of the American soil is wholly attributable to vegetable matter.

The specimens of cotton soil received from Georgia are ten in number, and are enclosed in tin vessels and bottles. They were very badly secured, or rather not secured at all; and hence the soils were not in so pure a state as could have been desired, having become mixed with fragments of straw used in the packing. These impu-

rities, however, being mostly large, were easily detected, and separated from the other organic substances naturally contained in the soil. Specimens of this kind should be secured in well-closed bottles, or in tin boxes, well and tightly soldered up.

These soils are all of a very similar nature, so that one general description may serve for all. The differences which exist between them are in the relative quantity of the constituents, and not in their nature. Their structure is light, porous, and friable, of such a nature as to present a considerable retentive power for water, and yet, from its openness, to allow of a considerable degree of drainage. They consist principally of sand, which, in the different specimens, varies slightly in its fineness and appearance: one of the soils, namely, that marked D, consists of but little else besides sand. The next substance which they contain is alumina, or clay, and this likewise varies considerably in quantity; in D it is present in a small quantity only; whilst in E it constitutes a large portion. Thirdly, they all contain oxide of iron, and manganese, in variable quantity; and to the presence of these substances the variations in colour are mainly attributable: the black soil, D 1, contains but little, and the red soil, a considerable quantity. These soils contain hardly any lime, a circumstance of considerable importance. They contain a trace of sulphate of lime, but only in very minute portions; and the quantity of carbonate of lime is so small as hardly to give rise to any perceptible effervescence when an acid is poured on them. When exposed to a strong heat, the organic matters which they contain are destroyed; these are of two kinds, the one being portions of plants, fibrous matters, &c., in a state of decay; and the other consisting of very finely-divided and soluble matters; these in the soils vary from four to eight per cent., and in the sub-soils from one and a-half to four. Besides these substances the soils also contain traces of saline matter. It does not seem as if the presence of any peculiar substance in the soils is essential to the successful cultivation of cotton. Considerable importance is attached by some to the existence of calcareous substances, considering its presence as almost essential. Mr. Molyneux states that one of the plantations from which specimens of soil is sent, is situated in a limestone district, and that the produce is invariably good. I have very little doubt that the goodness of this plantation is but little influenced by the calcareous nature of the strata in a chemical point of view; because, as I have already stated, the soils contain hardly any lime. The influence which the soils exert on the produce of the cotton-plant, depends probably more on the mechanical texture than on the

chemical composition. Its tenacity must not be too great, but it must be loose and friable, so that the delicate fibres of the roots can penetrate easily in all directions. Its capacity for heat and retentive power for moisture, which of course regulate in some measure the rapidity of evaporation and dryness of soil, is also of great importance. Those soils which remain too moist or become too easily dry, and in drying become hard, as is the case with some clayey soils, are of course bad, and the presence of these qualities is probably of far more importance than the presence of any peculiar substance in the soil.
